

2.3.15. Blind Speeds

2.3.15.1. Purpose

The purpose of this test is to determine at which closure rates that the radar is blind and to assess the effects that these blind closure rates have upon intercept tactics.

2.3.15.2. General

As described in the radar theory section the radar must be pulsed, even in the VS mode, to allow the same antenna to be used for both transmit and receive. A side effect of the pulsing process is that the velocity spectrum repeats itself at intervals related to the PRF and so the doppler shift becomes ambiguous at some regular interval. The radial velocity at which the radar is blinded by clutter is repeated at some regular interval. Several techniques, such as PRF stagger and choosing the correct PRF can ease the problem considerably, however a check should be made to see if the blind closure rates encountered are tactically significant. The technique is very similar to the blind range test described earlier.

2.3.15.3. Instrumentation

Data cards and an optional voice recorder are required for this test.

2.3.15.4. Data Required

Record the test airplane and the target's heading, h_{po} , V_o , OAT_o and winds aloft before the test begins. During the turn, record the target headings and radar derived bearing when detection is lost or regained.

2.3.15.5. Procedure

Perform a maximum detection range test using the VS mode. After solid detection is obtained, record the parameters listed above and then call for the target to begin a level constant speed turn. The turn should begin before the target closes to inside 40 nm as shown on the air-to-air TACAN. The turn should be at 15° angle of bank. For radars that display pure closure rate, as the turn continues, the VS closure rate should reduce to 0, take misses as the closure rate changes to an opening rate, and then regain detection as the closure rate returns on the other side of the turn. The angle to the target will vary through the target turn radius. For radars that display closure

rate with the test airplane's component of closure rate subtracted, the target will disappear as the target passes the heading perpendicular to the test airplane's flight path and then should regain detection after another 180° of turn.

During the turn, the target should call headings passed every 10° (5° if possible) over the radio. The test airplane should monitor the VS display for target misses, recording the called headings and radar derived bearings at which detection is lost and then regained, particularly in times of detection holes of several sweeps. These areas should be qualitatively evaluated for their duration and severity. If problems are noted during this test, a second run should be performed to confirm the results and to ensure that the holes were not caused by transient detection losses. During mission relatable intercepts in the VS mode, the blind closure rates should be qualitatively assessed for their effects upon tactics.

Repeat the test in each PD search mode. The target may be lost at any time in the turn during the PD test. If blind speeds are noted, the test should be repeated to ensure the drop-outs are due to blind speeds and not to other detection drops.

2.3.15.6. Data Analysis and Presentation

The procedure used in the target groundspeed accuracy test should be used to determine the test airplane and target's groundspeed before the turns began. At the headings where detection was lost or gained, the closure rate should be calculated as outlined in the groundspeed accuracy test. If problems were noted on the first test and the test was repeated, the results should be compared by plotting detection presence (1 or 0) versus the closure rates for the different runs. A consistent overlap indicates a true blind closure rate vice spurious misses. If a poor detection level occurs at a repeatable closure rate band or if the detection level is generally poor during the maneuvers compared to the constant closure rate inbound run, this should be noted. Relate the number and size of the empty and poor detection bands that are repeatable over more than one run to the possibility of a target using these blind closure rates to perform its own intercept upon the test airplane while being undetected. Relate the presence

of generally poor detection levels for a target passing through a number of closure rates to the poor detection level that will occur as a target closes on the defended point while the test airplane is off the direct threat axis.

2.3.15.7. Data Cards

Sample data cards are provided as card 19.

CARD NUMBER _____ TIME _____ PRIORITY _____

L/M/H

BLIND SPEEDS

[PERFORM A MAXIMUM DETECTION RANGE TEST.

RECORD THE WINGS LEVEL DATA.]

RADAR MODE _____

	h_{po}	V_o	OAT_o	WINDS ALOFT	BEARING
TEST					
TARGET					

[BEFORE 40 NM SEPARATION ON THE AIR-TO-AIR TACAN, HAVE THE TARGET BEGIN A 15° ANGLE OF BANK, CONSTANT SPEED TURN. HAVE THE TARGET CALL ITS HEADING PASSED EVERY 10°. RECORD THE CALLED HEADINGS AND RADAR BEARINGS FOR LOSS/REGAIN OF DETECTION OR BEGINNING/END OF THE POOR DETECTION LEVEL AREAS. IF PROBLEMS ARE NOTED, REPEAT THE TEST ON ANOTHER CARD. REPEAT THE ENTIRE TEST FOR EACH VS AND PD SEARCH MODE.]

BLIND SPEEDS

LOST/GAINED (L/G)	HEADING CALLED	RADAR BEARING

[DURING MISSION RELATABLE INTERCEPTS, RECORD QUALITATIVE COMMENTS CONCERNING THE EFFECTS OF THE BLIND SPEEDS UPON INTERCEPT TACTICS.]

EFFECTS: